NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: DRAFT

Region: Washington Regional Office
County: Hertford
NC Facility ID: 4600099
Inspector's Name: Betsy Huddleston
Date of Last Inspection: 05/10/2019
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Nucor Steel - Hertford

Facility Address:
Nucor Steel - Hertford
1505 River Road
Cofield, NC 27922

SIC: 3312 / Blast Furnaces And Steel Mills
NAICS: 331111 / Iron and Steel Mills

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 15A NCAC 02D .0515, .0516, .0521
NSPS: N/A
NESHAP: N/A
PSD: N/A
PSD Avoidance: N/A
NC Toxics: N/A
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Bill Vaughan Environmental Manager (252) 356-3707 PO Box 279 Winton, NC 27986	Robert McCracken VP-General Manager (252) 356-3707 PO Box 279 Winton, NC 27986	Bill Vaughan Environmental Manager (252) 356-3707 PO Box 279 Winton, NC 27986

Application Data

Application Number: 4600099.19B
Date Received: 11/05/2019
Application Type: Modification
Application Schedule: TV-Significant

Existing Permit Data
Existing Permit Number: 08680/T23
Existing Permit Issue Date: 10/25/2019
Existing Permit Expiration Date: 09/30/2024

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2018	97.48	267.51	18.24	1379.63	169.50	5.47	3.63 [Hexane, n-]
2017	77.88	384.35	13.28	1826.43	132.15	5.84	2.89 [Hexane, n-]
2016	108.75	331.73	10.61	1103.65	126.56	4.34	2.77 [Hexane, n-]
2015	60.02	326.36	15.18	1174.85	114.61	6.74	3.13 [Benzene]
2014	211.02	394.72	17.14	1388.76	111.54	7.13	3.32 [Hexane, n-]

Review Engineer: Kevin Godwin

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 08680/T24
Permit Issue Date: DRAFT
Permit Expiration Date: 9/30/2024 This Air Quality Permit shall expire on the earlier of September 30, 2024 or the renewal of Permit No. 08680T22 has been issued or denied.

I. Introduction and Purpose of Application

A. Nucor Steel owns and operates a plate steel manufacturing plant at this Hertford County site. This permit action is for the following changes to the existing Permit:

1. installation and operation of a natural gas-fired burning bed (ID No. ES215) with one natural gas/oxyfuel-fired torch (0.25 million Btu per hour heat input) and associated bagfilter (4.5:1 air to cloth ratio, ID No. CD21),
2. update emission calculations for the existing Cooling Towers (ID Nos. ES38, ES39, ES40, and ES102),
3. update existing vaporizer (ID No. ES208) to Oxygen Plant Vaporizer with two 11.0 million Btu per hour heat input each and remove vaporizer (ID No. ES209),
4. remove various storage tanks currently listed on the insignificant activity list,
5. remove source (I-09) from the insignificant activity list,
6. remove the Air Liquide oxygen plant sources as the plant will no longer operate,
   a. ES84 – Emergency Generator,
   b. TES17 – Air separator unit, natural gas-fired heater,
   c. ES201 – Natural gas-fired 2 bundle oxygen vaporizer,
   d. I-17 – Air Separator Unit (ASU) sump vents and cooling towers,
   e. I-39 – Oxygen Plant Heater, and
   f. I-40 – Cooling Tower
7. Remove ES109 and ES111 – Plasma torch (0.32 million Btu per hour heat input) on the normalizing line and associated control device CD10.

B. Because this modification does involve a significant change in existing monitoring, recordkeeping, and reporting requirements, it is being process as a Significant Modification under 15A NCAC 02Q .0516. The draft Permit and review will undergo a 30-day public notice period and 45-day EPA review.

II. Changes to Existing Air Permit

The following changes were made to the Nucor Steel – Hertford, Air Permit No. 08680T23:

Page No.	Section	Description of Change(s)
Cover letter	N/A	Amended application type; permit revision numbers, and dates. Updated PSD increment tracking statement.
N/A	Insignificant Activities List	Updated the insignificant activities list based on the application.
1	Permit cover page	Amended permit revision numbers and all dates.
3	Table of Emission Sources	**Normalizing Line**: ES108 and ES110 listed as Normalizing Robot Arm with one oxyfuel and one plasma torch; Removed sources ES109, ES111 **Other Sources**: Included new burning bed (ID No. ES215) and associated bagfilter (ID No. CD21) Internal Combustion Engine Sources: Removed source (ID No. ES84) **Miscellaneous Sources**: Removed sources (ID Nos. TES17, ES201, and ES209)
Throughout Permit	Table of Limits and Standards	Removed "NAAQS and Increment Modeled Rates"
14	2.1 A.4.c	Removed NAAQS and PSD increment modeled rates.
24	2.1 B.3.b	Removed NAAQS and PSD increment modeled rates.
29	2.1 D.2.b	Removed NAAQS and PSD increment modeled rates.

Page No.	Section	Description of Change(s)
30 and 31	2.1 E.2.b and E.3.b	Removed NAAQS and PSD increment modeled rates.
32	2.1 F.1.b.	Removed NAAQS and PSD increment modeled rates.
35	2.1 H.	Removed source ID No. ES84.
49	2.1 I.3.b	Removed NAAQS and PSD increment modeled rates.
54	2.1 K.3.b	Removed NAAQS and PSD increment modeled rates.
57	2.1 L.2.b	Removed NAAQS and PSD increment modeled rates.
60	2.1 M.3.b	Removed NAAQS and PSD increment modeled rates.
61	2.1 N.	Removed source ID No. TES17.
New Page No. 61	2.1 O.	Included source ID Nos. ES108 and ES110 as robot arm with one oxyfuel and one plasma torch. Removed sources ID No. ES109, ES111 and ES117.
75	2.1 S.	Removed source ID No. ES201.
New Page No. 76	2.1 T.	Included update to source ID No. ES208 and removed source ID No. ES209.
New Page No. 82	2.1 V.	Included source ID No. ES215 and associated bagfilter ID No. CD21.
88	2.2 A.1.	Removed source ID No. ES209.

III. Statement of Compliance

On February 23, 2020 the facility was issued a Notice of Violation (NOV) for increases in the PM10 hourly emission rates in excess of the listed NAAQS and increment rates associated with updated emissions calculation estimates from the Cooling Towers. This Permit modification is to remove those listed hourly emission rates. See Section VII of this Review for an explanation.

According to IBEAM Documents, the most recent compliance inspection was performed in June 2018 by Ms. Betsy Huddleston, Washington Regional Office (WARO). According to the inspection report dated September 27, 2018, the facility appeared to operate in compliance with all applicable air quality regulations and permit conditions at the time of inspection.

The five-year compliance history is outlined in the inspection report as follows:

7/01/2015: Notice of Violation
15A NCAC 2D.0530 - Permit Specific Condition 2.1.I.3.d.
15A NCAC 2D.0515 - Permit Specific Condition 2.1.O.1.c.
15A NCAC 2D.0614 – Permit Specific Condition 2.1Q.3.c.
Q&T line torches (ID Nos. ES98 and ES99) and south plasma shear (ID Nos. ES110) baghouses monthly external inspection records missing.
Daily DRI system visible emissions observations were not conducted for six-minute periods.

2/16/2016: Notice of Violation/Notice of Recommendation for Enforcement
40 CFR Part 60, Subpart A, 60.7 and 60.13
Failure to retain COM data per the regulation.
Civil Penalty Assessed
Case No. 2016-002, $21,010.00

6/09/2016: Notice of Violation
15A NCAC 2D.0530 - Permit Specific Condition 2.1.I.3.d.
15A NCAC 2D.0515 - Permit Specific Condition 2.1.O.1.c.
Q&T line torches (ID Nos. ES98 and ES99) and shears' baghouse monthly external inspection records missing.

IV. Application Chronology

Application received	November 5, 2019
Draft to Applicant and Washington Regional Office (WARO)	April 17, 2020
Draft to DAQ Supervisor	April 28, 2020
Draft to Public Notice and EPA for review	XXXXX

V. Emissions

A. Burning bed (ID No. ES215) – The burning bed will be permitted to operate one natural gas/oxyfuel-fired torch. PM emissions are estimated using a bagfilter outlet concentration of 5 mg/m^3. Emissions from natural gas/oxyfuel-fired torches are calculated using AP-42 factors for natural gas firing.

Sample Calculation:

PM10 = (5mg/m^3)*(g/1000 mg)*(lb/453.6 g)*(m^3/35.3 ft^3)*(10,300 ft^3/min)*(60 min/hr) = 1.93E-01 lb/hr

B. Cooling Towers (ES38, ES39, ES40, and ES102) – Particulate matter emissions are based on the calculation equation in AP-42, Section 13.4. Particulate speciation factors were used from a widely peer reviewed journal article and CARB database. These calculations are included in Appendix A of the application.

Sample Calculation:

PM = Circulation Rate * Drift Loss * Total Dissolved Solids Concentration/10^6 * 60 min/hr * Density
For ES38
PM = 25,000 gpm * 0.007% * 5000/10^6 *8.34 lb/gallon = 4.38 lb/hr

According to the application, PM10 emissions are percentages of PM determined by interpolation using Table 7 (Reisman and Frisbie)

Thus, PM10 = 33.8% * 4.38 lb.hr = 1.48 lb/hr

VI. Regulatory Review – Specific Emission Source Limitations

A. 15A NCAC 02D .0515 "Particulates from Miscellaneous Industrial Processes" – The new burning bed (ID No. ES215) is subject to this regulation. According to the application, the process rate for the new burning bed is 20 tons/hour. The PM emission limit for process rates < 30 tons/hour is calculated as follows:

$$E = 4.10 * P^{0.67}$$

Thus, E = 30.5 pounds/hour for ES215. Based on calculations included in the application, Appendix A, controlled emissions are calculated from vendor guarantee to be 1.93E-01 lb/hr. Therefore, compliance is indicated.

Process input rate and control device monitoring, recordkeeping, and reporting will be required for this source.

B. 15A NCAC 02D .0516 "Sulfur Dioxide Emissions from Combustion Sources" - Emission of sulfur dioxide from any source of combustion that is discharged from any vent, stack, or chimney shall not exceed 2.3 pounds of sulfur dioxide per million Btu input. Natural gas combustion in this source will not cause the limit to be exceeded. Therefore, compliance is demonstrated.

C. 15A NCAC 02D .0521 "Control of Visible Emissions" - For sources manufactured after July 1, 1971, visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period. However, except for sources required to comply with Paragraph (g) of this Rule, six-minute averaging periods may exceed 20 percent opacity if:
   (1) No six-minute period exceeds 87 percent opacity;
   (2) No more than one six-minute period exceeds 20 percent opacity in any hour; and
   (3) No more than four six-minute periods exceed 20 percent opacity in any 24-hour period.

The Permittee shall establish "normal" for these sources in the first 30 days of beginning operation. If visible emissions from these sources are observed to be above normal, the Permittee shall either:

i. take appropriate action to correct the above-normal emissions as soon as practicable and within the monitoring period and record the action taken as provided in the recordkeeping requirements below, or
ii. demonstrate that the percent opacity from the emission points of the emission source in accordance with 15A NCAC 02D .2610 (Method 9) for 12 minutes is below the limit.

Monthly monitoring, recordkeeping, and reporting is required.
Compliance with this regulation is expected.

VII. Regulatory Review – Multiple Emission Source Limitations

A. 15A NCAC 02D .0530 "Prevention of Significant Deterioration" – Nucor is a PSD major stationary source. According to calculations included in Appendix A of the application, potential criteria pollutant emissions increases are less than significant emission rates (SERs). Therefore, the project is not subject to PSD review.

The following table provides a summary of potential criteria pollutant emissions increases from the new burning bed.

Source	ID No.	CO (tpy)	NOx (tpy)	TSP (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO_2 (tpy)	VOC (tpy)	Pb (tpy)	CO_{2e} (tpy)
Burning bed	ES215	0.01	0.01	0.85	0.85	0.85	0	0	8.75E-08	21
SER		100	40	25	15	10	40	40	0.6	75,000

According to the application, the facility did not conduct a PSD netting analysis for to the Cooling Tower emissions updates for the following reasons:

1. The updated data for the cooling towers is not a major modification and there is no physical change or change in method of operation.
2. Upon comparing the potential emissions data, the change in emissions are less than the SER for each pollutant.
3. All of the Cooling Towers were not installed at the same time.
4. The BACT requirements listed in the Permit Conditions 2.1 remain unchanged and will continue to be met.
5. The facility submitted PSD increment and NAAQS modeling for PM, PM10, and PM2.5 to support the changes in particulate emissions associated with the calculation procedure update.

All components of the PSD requirements continue to be met as a result of the updated calculations because:

There are no changes required to the existing BACT requirements and compliance with PM10 and PM2.5 NAAQS and increment requirements are demonstrated through modeling.

Regarding the February 23, 2020 NOV, the current Permit lists PM10 and PM2.5 NAAQS and increment emission rates in Condition 2.1 E.2.b as follows:

b. The following limits are required in order to demonstrate compliance with the National Ambient Air Quality Standards and the PSD increments as required by 15A NCAC 2D .0530; 40 CFR 51.166(k):

Emission Source	Pollutant	Pounds per Hour
Cooling Tower (ID No. ES38)	$PM_{2.5}$	0.18
	PM_{10}	0.30
Cooling Tower (ID No. ES39)	$PM_{2.5}$	0.34
	PM_{10}	0.57
Cooling Tower (ID No. ES40)	$PM_{2.5}$	0.04
	PM_{10}	0.07

The updated emission rates are different from the listed in the current Permit. The following table taken from the application shows updated PM emissions.

Source ID	lb/hr		
	PM	PM10	PM2.5
I-43	1.40E-01	1.15E-01	4.20E-04
I-44	5.60E-01	3.56E-01	1.18E-03
ES38	4.38	1.48	8.32E-03
ES39	4.75	1.61	9.03E-03
ES40	2.84E-01	2.06E-01	6.25E-04
ES102	7.01E-02	5.75E-02	2.10E-04
I-41	4.27E-02	3.82E-02	2.73E-04
I-42	1.14E-02	1.02E-02	7.30E-05

According to the application, the PM10 and PM2.5 emission rates listed in the current Permit are not considered BACT limits, but instead were established to demonstrate compliance with the NAAQS and increment for a past permitting activity. As such, these limits should be considered state-only limitations. There are currently 21 Sections in the Permit. Of these 21 Sections, only nine (9) Sections have similar state-only limits for PM10, and PM2.5 NAAQS and increment, while all 21 Sections have emission sources that emit PM. There might have been some PM modeling issues associated with the facility's initial permitting action. With the updated emission rates, updated models, and updated modeling techniques, there have been no recently identified particulate modeling issues for the facility.

Updated dispersion modeling demonstrates compliance with PM10 and PM2.5 NAAQS and increment standards. The modeling was reviewed by Mr. Matthew Porter, Meteorologist II, NC DAQ Air Quality Analysis Branch (AQAB). According to Mr. Porter's memo dated December 20, 2019, "the updated modeling supports the Title V significant modification that proposes addition of a new natural gas oxyfuel fired burning bed with baghouse as well as site-wide updates to Cooling Tower PM emissions calculations (i.e., increases). In summary, the updated modeling demonstrates compliance with the $PM_{2.5}$ and PM_{10} NAAQS and Class II Area PSD Increments as well as the TSP SAAQS."

The facility previously conducted a full PM modeling analysis in 2017 that was associated with a PSD application and identified no PM modeling issues. Based on recent and previous modeling results, the facility is requesting that the state-only modeled emission rates for PM10 and PM2.5 NAAQS and increment be removed from the Permit. The BACT limitations for each emission source yield the modeled emission rates and thus are adequate for demonstrating compliance with the NAAQS and increment requirements. NCDAQ agrees with removing these modeled emission rates throughout the Permit.

B. 15A NCAC 02D .0614 "Compliance Assurance Monitoring (CAM)" – The following table included in the application provides a summary of CAM applicability. The applicant uses a 99% control efficiency to back calculate from the vendor's guaranteed outlet concentration.

Source	**Pollutant**	**Control Device**	**Applicable Regulation**	**Pre-Controlled Emissions** (tpy)	**Major Source Threshold** (tpy)	**Subject to CAM**
Burning bed (ES215)	PM-10	Bagfilter	02D .0515	84.54	100	No

C. 15A NCAC 02Q .0711 "Toxic Air Pollutant (TAP) Procedures" – This regulation requires that new and modified sources of TAP with emissions exceeding specified Toxic Permit Emission Rates (TPER) apply for a permit to emit TAPs. Nucor has previously performed a facility-wide TAP compliance demonstration that was approved by the NC DAQ Analysis Branch on October 18, 2017. According to the application, this project will result in small increases of several previously triggered TAPs (acrolein, benzene, formaldehyde, arsenic, beryllium, cadmium, chromium, manganese, mercury, and nickel).

The following table provides a summary of previously modeled TAPs and current facility-wide emissions.

Pollutant	**Averaging Period**	**Maximum Concentration** ($\mu g/m^3$)	**AAL** ($\mu g/m^3$)	**% of AAL**	**Current Facility-wide Emissions**
Acrolein	1-hour	2.47	80	3.09 %	1.09E-01 lb/hour
Arsenic	Annual	7.00E-05	2.10E-03	3.33 %	1.19E+01 lb/year
Benzene	Annual	2.18E-02	0.12	18.2 %	1.80E+04 lb/year
Beryllium	Annual	4.0E-05	4.10E-03	0.98 %	2.52E+01 lb/year
Cadmium	Annual	8.10E-04	5.50E-03	14.73 %	3.26E+02 lb/year
Soluble Chromate Compounds	24-hour	4.20E-04	0.62	0.07%	7.10E-02 lb/day
Formaldehyde	1-hour	25.06	150	16.71 %	9.72E-01 lb/hour

n-hexane	24-hour	0.85	1,100	0.08 %	8.06 lb/day
Manganese	24-hour	0.26	31	0.84 %	1.27E+01 lb/day
Mercury	24-hour	2.61E-02	0.60	4.35 %	5.91 lb/day
Nickel metal	24-hour	6.75E-03	6	0.11%	8.37E-01 lb/day

TAP increases as a result of this modification are as follows:

Acrolein = 7.20E-10 lb/hour
Arsenic = 8.00 E-09 lb/hr
Benzene = 8.40E-08 lb/hr
Beryllium = 4.8E-10 lb/hr
Cadmium = 4.40E-08 lb/hr
Soluble Chromate Compounds = 1.52E-08 lb/hr
Formaldehyde = 3.00E-06 lb/hour
Manganese = 1.52E-08 lb/hr
Mercury = 1.04E-08 lb/hr
Nickel metal = 8.40E-08 lb/hr

According to the application, the largest increase of any TAP on a lb/hr basis is 0.02% for soluble chromium compounds. Given the small increases, impacts would not approach the AAL. No new modeling has been conducted. In accordance with G.S. 143-215.107(a), the proposed modification does not pose an unacceptable heath risk.

VIII. Other Regulatory Requirements

- An application fee of $970.00 is required and was received by DAQ.
- The appropriate number of application copies was received on November 5, 2019.
- A Professional Engineer's Seal was included for this application (ref. M. Dale Overcash, P.E. Seal No. 12627).
- Receipt of the request for a zoning consistency determination was acknowledged by Robert Mizelle, Hertford County Zoning Department, on November 19, 2019. The proposed operation is consistent with applicable zoning ordinances.
- 30-day Public notice and 45-day EPA review is required for this One Step Significant Modification under 15A NCAC 02Q .0516.
- IBEAM Title V Equipment Editor (TVEE) update was verified on XXXX.
- According to the application, the facility does not handle any of the substances subject to 112(r) at quantities greater than the applicability threshold.
- The application was signed by Mr. Robert McCracken, V.P. – General Manager, on October 31, 2019 as the Responsible Official.

IX. Draft/Proposed Permit Review Summary

- The WARO was provided a draft permit for review on April 17, 2020. Mr. Yongcheng Chen responded on April 20, 2020 with no comments on the draft.
- Nucor was provided a draft permit for review on April 17, 2020. Nucor responded on April 24, 2020 with minor comments. All comments have been addressed.

X. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit will be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Copies of the public notice will be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit pursuant will be provided to EPA. Also pursuant to 02Q .0522, a notice of the DRAFT Title V Permit will be provided to each affected State at or before the time notice provided to the public under 02Q .0521 above. The public notice period expired on XXXX with XX comments received. The EPA review period expired on XXXX with XX comments received.

XI. Recommendations

This Title V Permit modification for Nucor Steel, Hertford County, North Carolina has been reviewed by DAQ to determine compliance with all procedures and requirements. NCDAQ has determined that this facility appears to be complying or is expected to achieve compliance as specified in the permit with all applicable requirements. Following Public Notice and EPA review periods, NCDAQ will make a recommendation on issuance of permit No. 08680T24.